

# NATURAL HISTORY MISCELLANEA

Published by  
The Chicago Academy of Sciences

Lincoln Park - 2001 N. Clark St., Chicago 14, Illinois

---

No. 41

March 12, 1949

---

## Notes on Mosquitoes from Leyte, Philippine Islands (Diptera, Culicidae)

George H. Bick\*

This report summarizes habitat data for 72 collections of mosquito larvae from the Tolosa area between February 1 and March 8, 1945, and for six collections from Carigara at the northeast corner of the island on February 22, 1945

The Tolosa area borders Leyte Gulf. It is sandy and well drained near the shore but at about one-fourth of a mile inland the soil is a heavy muck and natural drainage provided by one sluggish creek was inadequate. The majority of collections were from the many artificial containers scattered about dwellings in the village of Tolosa. Immediately to the south of the village, during the collection period, was a Navy base under construction in an extensive coconut grove. Larvicidal operations were carried out at five-day intervals at the Navy base throughout the collecting period.

According to Holt and Russell (1932) the annual rainfall for the Tolosa area is 100 inches; there is no dry season and there is a very pronounced maximum rainfall in winter. The collections were made at the height of the wet season. There was scarcely a day without rain. The annual normal temperature is 80° F., the mean maximum 96° F., the mean minimum 68° F.

The majority of specimens were checked by Dr. Alan Stone, U. S. National Museum. All specimens have been placed in the Tulane University collections.

In the literature are records of 28 species from Leyte (Holt and Russell, 1932; Bohart, 1945; Knight and Lafoon, 1946; Rozeboom, 1946; Knight and Rozeboom, 1946; Lafoon, 1946; Knight, 1947a, b; Knight and Chamberlain, 1948). To this list 11 species, recorded for the first time from Leyte, are added in this paper. These are: *Anopheles subpictus indefinitus*, *An. hyrcanus lesteri*, *An. kochi*, *Toxorhynchites amboiensis*, *Armigeres obturbans*, *Arm. malayi*, *Aedes aegypti*, *Culex nigropunctatus*, *C. fuscocephalus*, *C. quinquefasciatus*, *C. gelidus*. Thus the total from Leyte is now 39 species.

\*Department of Zoology, Tulane University of Louisiana, New Orleans.

All Leyte records are summarized in the following list.

<i>An. barbirostris</i>	Carigara	H and R, '32 H
<i>An. minimus flavirostris</i>	Carigara, Biliran I.	and R, '32 H
<i>An. vagus limnosus</i>	Biliran I.	and R, '32 H
<i>An. maculatus</i>	Biliran I.	and R, '32
<i>An. subpictus indefinitus</i> <i>An. hyrcanus lesteri</i>	Tolosa, Carigara	Author
	Carigara	Author
<i>An. kochi</i>	Carigara, Tolosa	Author
<i>Toxorhynchites amboiensis</i>	Tolosa	Author
<i>Topomyia barbata</i> <i>Mansonia uniformis</i> <i>Armigeres obturbans</i>	Tacloban	K and C, '48 K
	Tacloban	and C, '48
<i>Armigeres malayi</i>	Tolosa	Author Author
<i>Aedes ferinus</i>	Tolosa, Carigara	K, '4 7a
<i>A. quadripunctis</i>	Dulag	K, '47a
<i>A. abadsantosi</i>	Dulag, Tacloban	K, '47 b
<i>A. stonei</i> <i>A. medleri</i>	Lagolago, Dagami	K and L, '46
	Mt. Lobi, Dagami	K and L, '46
<i>A. arananus</i>	Tacloban, Calicoan I.	K and L, '46
<i>A. flavipennis</i>	Tacloban, Calicoan I.	K and L, '46
<i>A. ananae</i> <i>A. poicilia</i>	Tacloban, Abuyog, Lagolago	K and L, '46
	Lagolago, Mt. Lobi, Dagami	
	Lagolago, Gabas, Tacloban,	
	Abuyog, Jinamoc I., Calicoan	K and L, '46
<i>A. paradisimilis</i>	I., Palo, Dulag, Valencia	
	Tacloban, Calicoan I.,	R, '46
<i>A. boharti</i>	Lagolago	K and R, '46
<i>A. albopictus</i>	Balinsasayao, Mt. Lobi	B, '4 5
	Leyte	Author Author
	Tolosa	L, '46
<i>A. aegypti</i> <i>A. robertsi</i> <i>A. johnsoni</i>	Tolosa	L, '46
	Tacloban	L, '46 L, '
<i>A. macrodixoa</i>	Tanauan	46
<i>A. nigrotarsis</i>	Tacloban	Author
	Tacloban, Abuyog	L, '46 L, '
<i>A. campylostylus</i>	Tolosa	46 B, '45
<i>A. umbrosus</i>	Tacloban	Author
<i>Culex fulleri</i>	Tacloban, Palo	B, '45 B, '
	Leyte	45 B, '45
<i>C. nigropunctatus</i>	Tolosa	Author
<i>C. annulirostris</i>	Leyte	Author
<i>C. sitiens</i>	Leyte	Author
<i>C. tritaeniorhynchus</i>	Tacloban, Jolo	Author
<i>C. fuscocephalus</i>	Tolosa	
<i>C. quinquefasciatus</i>	Tolosa	
<i>C. gelidus</i>	Tolosa	

	Number of species previously recorded	Number added
<i>Anopheles</i>	4	3
<i>Toxorhynchites</i>	0	1
<i>Topomyia</i>	1	0
<i>Mansonia</i>	1	0
<i>Armigeres</i>	0	2
<i>Aedes</i>	18	1
<i>Culex</i>	4	4
	28	11

Ecological notes for each species follow.

***Anopheles (Anopheles) hyrcanus lesteri* Baisas and Hu**

This species is represented by a single collection from Carigara. It was found in a rice field in the shade in clear water along with *An. kochi* and an unidentified *Culex*.

***Anopheles (Myzomyia) kochi* Donitz**

Three collections were recorded: two from Carigara, one from Tolosa. Two collections were from exposed puddles, one from a rice field in the shade. All were in clear water. It was found once in a pure collection, once with *An. hyrcanus lesteri* and an unidentified *Culex* and once with an unidentified *Anopheles*.

***Anopheles (Myzomyia) subpictus indefinitus* (Ludlow)**

This species was present in four collections: one from Tolosa and three from Carigara. The data for each collection are: a temporary, exposed puddle in clear water with algae and debris; a creek border in clear water in the shade with emergent vegetation and debris; an exposed artificial container in stained water; a swamp with algae and emergent vegetation. *Subpictus* occurred three times in pure collections and once with *C. quinquefasciatus*.

***Toxorhynchites amboiensis* (Doleschall)**

Collected once from polluted water in an artificial container in an exposed situation. No other species of mosquito larvae was present.

***Armigeres (Armigeres) obturbans* (Walker)**

Of 11 collections nine were from coconut shells, two from artificial containers. Seventy-seven per cent were in exposed situations, 22 per cent in shaded. The water was either polluted (40%) or stained (60%). *Obturbans* occurred only in pure collections.

***Armigeres (Armigeres) malayi* (Theobald)**

*Malayi* was present in seven collections from Tolosa and in one from Carigara. Seven (87%) were from coconut shells, one (12%) from an artificial container. Seventy-five per cent of the containers were in exposed situations, 25 per cent in shaded. Sixty-two per cent of the collections were from stained water, 37 per cent from polluted water. *Malayi* was the only mosquito present in six of the collections. It occurred twice with *A. albopictus*.

*Aedes (Stegomyia) albopictus* (Skuse)

Of the 25 collections *albopictus* occurred most often in artificial containers (56%), less often in coconut shells (32%), and rarely in tree holes (12%). No preference for either exposed (43%) or shaded (57%) was indicated. The majority of the collections were from stained water (57%), 28 per cent were from clear water, and 14 per cent from polluted water. *Albopictus* occurred primarily in pure collections (84%), but was recorded three times (12%), with *Armigeres malayi*, and once (4%) with *C. quinquefasciatus*.

*Aedes (Stegomyia) aegypti* (Linnaeus)

In a total of seven collections, 6 (86%) were from artificial containers and one (14%) from a tree hole. Four (57%) were from shaded situations, 3 (43%) from exposed. The water was always either stained or polluted. In six of the collections *aegypti* was the only mosquito present. It was found once with *C. quinquefasciatus*.

*Aedes (Aedes) nigrotarsis* (Ludlow)

A single pure collection was taken from an exposed puddle in clear water about four inches deep without vegetation and averaging 15 larvae per dip.

*Culex (Culicomyia) nigropunctatus* Edwards

A single collection was taken from an artificial container in an exposed situation in stained water one inch deep along with *Aedes albopictus* and an unidentified *Anopheles*.

*Culex (Culex) tritaeniorhynchus* Giles

In five collections 60 per cent were from puddles, 20 per cent from creek pot holes, 20 per cent from swamps. Sixty per cent of the collections were from clear water, 20 per cent in muddy water and 20 per cent in stained water. All collections were in exposed situations. Vegetation was absent in 20 per cent of the collections, algae was present in 20 per cent and emergent vegetation in 20 per cent. It occurred mostly (80%) in pure collections but was found once (20%) with *C. gelidus*.

*Culex (Culex) fuscocephalus* Theobald

Two collections were taken. One was from a shallow borrow pit in the immediate area of a shower drain containing dirty soapy water with emergent vegetation. *C. quinquefasciatus* was also present. The other collection was from an exposed puddle in clear water and without vegetation. *Fuscocephalus* was the only mosquito present.

*Culex (Culex) quinquefasciatus* Say

In 15 collections 80 per cent were from artificial containers, 20 per cent from borrow pits. Two of the borrow pits contained dirty soapy water from a shower drain. Fifty three per cent of the collections were from exposed situations, 47 per cent from shaded. It occurred mostly (80%) in pure collections but was collected once with *A. aegypti*, once with *C. fuscocephalus* and once with *A. albopictus*.

*Culex (Culex) gelidus* Theobald

Represented in a single collection from an exposed creek pot hole with algae in clear water along with *C. tritaeniorhynchus*.

Table I. Summary of Collections by Habitat.

	Creeks	Swamps	Rice Fields	Borrow Pits	Puddles	Tree Holes	Coconuts	Artificial Containers	Total	Per cent Occurrence†
No. of Collections	2	2	1	3	8	4	22	36	78	—
Per cent of Total	2	2	1	4	10	5	28	46	—	—
<i>C. gelidus</i>	1								1	1
									5	6
									4	5
									1	1
									3	4
<i>C. fuscocephalus</i>				1					2	2
<i>A. nigrotarsis</i>					1				1	1
<i>Arm. obturbans</i>										
<i>Arm. malayi</i>										
<i>C. quinquefasciatus</i>				3					12	15
<i>A. albopictus</i>									3	8
<i>A. aegypti</i>									1	1
<i>Toxorhynchites amboiensis</i>									6	7
<i>C. nigropunctatus</i>									1	1
									1	1

†Obtained by dividing number of collections of the particular species by  
was present in a collection the total exceeds 100 per cent.

number of collections. Since often more than one species

Habitat data for all species represented in these collections are summarized in Table I.

The habitats are arranged in sequence from natural surface water (creeks, swamps) through artificial surface water (rice fields, borrow pits, puddles) to natural container habitats (tree holes, coconuts) and to artificial container habitats. The species follow a corresponding arrangement.

Nineteen per cent of the collections were from surface water and the limited data indicate that the first seven species are surface water species. In contrast, 79 per cent of the collections were from containers and the other seven species are container species.

The most productive single habitat was artificial containers which constituted 46 per cent of the total collections.

*Aedes albopictus* was the most common species and was present in 32 per cent of the collections. Either *albopictus* or *C. quinquefasciatus* were present in 51 per cent of the collections. Both were container species and were found primarily in artificial containers.

Mosquito control in this area is primarily a domestic problem.

Literature Cited

- Bohart, Richard M.  
1945 A synopsis of the Philippine mosquitoes. U. S. Navy, Bur. Med. Surg., NAVMED 580, p. 1-88, 91 fig.
- Holt, Rufus L. and Paul F. Russell  
1932 Malaria and *Anopheles* reconnaissance in the Philippines. Philippine Jour. Sci., vol. 49, no. 3, p. 305-371, 7 pl.
- Knight, Kenneth L.  
1947 a The *Aedes (Mucidus)* mosquitoes of the Pacific. Washington Acad. Sci., Jour., vol. 37, no. 9, p. 315-325, 8 fig.  
1947 b The *Aedes (Finlaya) chrysolineatus* group of mosquitoes. Ent. Soc. Amer., Ann. vol. 40, no. 4, p. 624-649, 14 fig.
- Knight, Kenneth L. and Roy W. Chamberlain  
1948 A new nomenclature for the chaetotaxy of the mosquito pupa, based on a comparative study of the genera. Helminthol. Soc. Washington, Proc., vol. 15, no. 1, p. 1-10, 35 fig.
- Knight, Kenneth L. and Jean Lafoon  
1946 The Oriental species of the *Aedes (Finlaya) kochi* group. Amer. Ent. Soc., Trans., vol. 72, p. 203-225, 34 fig.
- Knight, Kenneth L. and Lloyd E. Rozeboom  
1946 The *Aedes (Stegomyia) albolineatus* group. Biol. Soc. Washington, Proc., vol. 59, p. 83-98, 23 fig.
- Lafoon, Jean  
1946 The Philippine mosquitoes of the genus *Aedes*, subgenus *Aedes*. Washington Acad. Sci., Jour., vol. 36, no. 7, p. 228-245, 29 fig.
- Roseboom, Lloyd E.  
1946 Three new *Finlayas* of the *dissimilis* group from the Philippine Islands. Jour. Parasitol., vol. 32, no. 6, p. 587-595, 22 fig.

*Natural History Miscellanea*, a series of miscellaneous papers initiated in 1946 as an outlet for original articles, more or less technical in nature, one to four pages in length, in any field of natural history. Individual issues, published at irregular intervals, are numbered separately and represent only one field of specialization; e. g., botany, geology, entomology, herpetology, etc. The series is distributed to libraries and scientific organizations with which the Academy maintains exchanges. A title page and index will be supplied to these institutions when a sufficient number of pages to form a volume have been printed. Individual specialists with whom the museum or the various authors maintain exchanges receive those numbers dealing with their particular fields of interest. A reserve is set aside for future exchanges and a supply of each number is available for sale at a nominal price. Authors may obtain copies for their personal exchanges at the prevailing rates for similar reprints.

H. K. Gloyd, Director of the Museum.

*Committee on Publications:*

Alfred Emerson, Hanford Tiffany, and C. L. Turner.